Kentucky

The Commonwealth of Kentucky was the Nation's leading coal producer until 1988, holding that position for over a decade before losing it to Wyoming.[1] It follows that most of the electricity in Kentucky (95.7 percent) is generated by coal-fired plants and that the five largest plants in the Commonwealth are coal-fired. The Commonwealth's two coalfields, one each in the eastern and the western part of the State, are separated by a large geologic uplift known as the Cincinnati arch. The eastern field is larger and is part of the Appalachian coal basin. The western field is a continuation of the Illinois coal basin, which also underlies parts of Illinois and Indiana. Coal from the eastern field has a lower sulfur content—between 1 and 2 percent by weight—than the western field. The largest utility presence in the Commonwealth is the Tennessee Valley Authority (TVA), the largest utility in the United States. TVA operates the largest plant in the Commonwealth, the Paradise plant.

Kentucky's five largest utilities—TVA, Kentucky Utilities Company, Louisville Gas and Electric Company, Big Rivers Electric Corporation, and East Kentucky Power Cooperative—operate more than 80 percent of the net summer capability. These and the other utilities in Kentucky—3 investor-owned, 30 public, and 26 co-operatives—serve a population of almost 4 million at an average price of 4.03 cents per kilowatthour of electricity. Only Idaho had cheaper electricity in 1996. Overall, the generation pattern observed in Kentucky over the 1986 through 1996 period examined in this report is one driven by coal, capped by a small layer of hydroelectric generation. The most salient aspect, with the exception of the almost tripling gas share of capability (in absolute terms, still not much), is that the fuel mix and capability and generation shares in Kentucky remained quite stable.

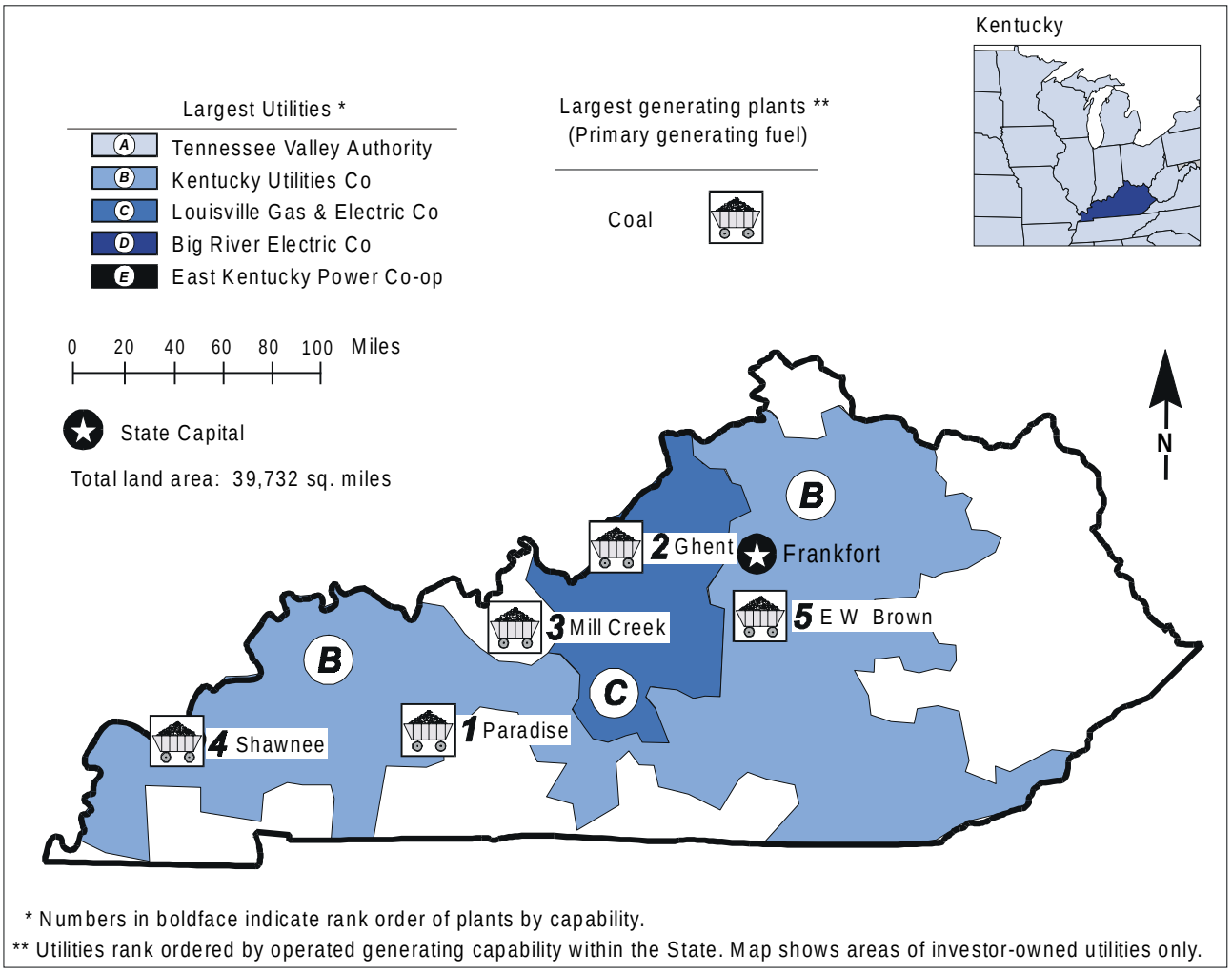
In 1996, Kentucky utilities generated 88.4 billion kilowatthours of electricity. The industrial sector accounted for over 50 percent of retail sales in 1991 and 1996 while the residential sector accounted for twice that of the commercial sector over the same period. Over the 11-year period examined in this report, utility electricity retail sales increased at an average annual rate of 4.5 percent, reaching 77.0 billion kilowatthours in 1996. Kentucky is an exporter of electricity with a net difference of 11.4 billion kilowatthours between generation and sales.

In 1996, Kentucky's power plants emitted more sulfur dioxide (SO_2) than all but four States. The Clean Air Act Amendments of 1990 cited 4,644 megawatts of nameplate capacity at eight Kentucky plants that were to comply with lower SO_2 emissions standards beginning in 1995. All of these plants have been in compliance since these standards took effect. Kentucky's power plant emissions of nitrogen oxides (NO_x) and carbon dioxide were eighth and eleventh highest, respectively, in 1996. It is likely that Kentucky's Department for Environmental Protection will need to design a State implementation plan for reducing ground-level ozone in response to a proposal released by the Environmental Protection Agency (EPA) in October 1998. The EPA proposal does not mandate which sources must reduce pollution. EPA acknowledges, however, that utilities would be one of the most likely sources of NO_x emissions reductions.

Since the price of electricity in Kentucky is so low and there are so few stranded costs, Kentucky has been reluctant to move forward with deregulating its electric power industry. In March 1998, the Kentucky legislature passed a resolution to create an Electricity Restructuring Task Force. The resolution was signed by the governor in April and a report is due in November 1999. In May 1998, a merger between Kentucky Utilities and Louisville Gas and Electric became final. The merger had been approved by the Public Service Commission in September 1997.[2]

[1] Energy Information Administration, *State Coal Profiles*, DOE/EIA-0576 (Washington, DC, January 1994), p. 43.

[2] Energy Information Administration, Status of State Electric Utility Deregulation Activity, http://www.eia.doe.gov/cneaf/electricity/chg_str/tab5rev.html.



* Numbers in boldface indicate rank order of plants by capability.
** Utilities rank ordered by operated generating capability within the State. Map shows areas of investor-owned utilities only.

Table 1. 1996 Summary Statistics

Item	Value	U.S. Rank
NERC Region(s)		ECAR/SERC
Net Exporter or Importer		Exporter
State Primary Generating Fuel		Coal
Population (as of 7/96)	3,882,071	24
Average Revenue (cents/kWh)	4.03	[a]2
Industry		
Total Capability (MWe)	W	[b]W
Total Generation (MWh)	W	[b]W
Utility Capability/person (KWe/person)	W	[b]W
Utility Generation/person (MWh/person)	W	[b]W
Sulfur Dioxide Emissions (Thousand Short Tons)	789	5
Nitrogen Oxide Emissions (Thousand Short Tons)	339	7
Carbon Dioxide Emissions (Thousand Short Tons)	88,309	7
Sulfur Dioxide/sq. mile (Tons)	19.85	7
Nitrogen Oxides/sq. mile (Tons)	8.52	8
Carbon Dioxide/sq. mile (Tons)	2,222.61	13

Item	Value	U.S. Rank
Utility		
Capability (MWe)	15,686	18
Generation (MWh)	88,438,224	15
Average Age of Coal Plants	25 years	
Average Age of Oil-fired Plants	30 years	
Average Age of Gas-fired Plants	13 years	
Average Age of Nuclear Plants	--	
Average Age of Hydroelectric Plants	45 years	
Average Age of Other Plants	--	
Nonutility[c]		
Capability (MWe)	W	W
Percentage Share of Capability	W	W
Generation (MWh)	W	W
Nonutility Percentage Share of Generation	W	W

-- = Not applicable. W = Withheld.

Table 2. Five Largest Utility Plants, 1996

Plant Name	Type	Operating Utility	Net Capability (MWe)
1. Paradise	Coal	Tennessee Valley Authority	2,169
2. Ghent	Coal	Kentucky Utilities Co	1,968
3. Mill Creek	Coal	Louisville Gas & Electric Co	1,470
4. Shawnee	Coal	Tennessee Valley Authority	1,330
5. E W Brown	Coal/Gas	Kentucky Utilities Co	1,097

Table 3. Top Five Utilities with Largest Generating Capability, and Type, Within the State, 1996
(Megawatts Electric)

Utility	Net Summer Capability	Net Coal Capability	Net Oil Capability	Net Gas Capability	Net Nuclear Capability	Net Hydro/Other Capability
A. Tennessee Valley Authority	3,687	3,499	--	--	--	188
B. Kentucky Utilities Co	3,535	2,961	108	440	--	26
C. Louisville Gas & Electric Co	2,739	2,468	--	223	--	48
D. Big Rivers Electric Corp	1,774	1,709	65	--	--	0
E. East Kentucky Power Coop Inc	1,392	1,322	--	--	--	70
Total	13,127	11,959	173	663	--	332
Percentage of Utility Capability	83.7	--	--	--	--	--

-- = Not applicable.

Figure 1. Utility Generating Capability by Primary Energy Source, 1996

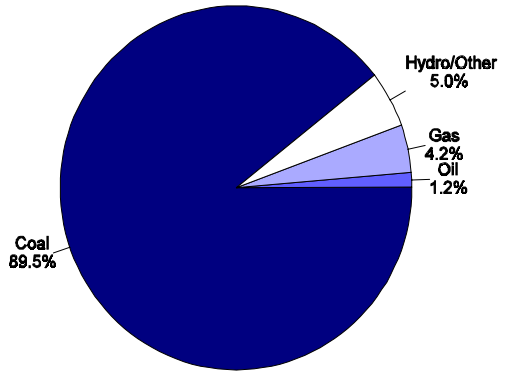


Figure 2. Utility Generation by Primary Energy Source, 1996

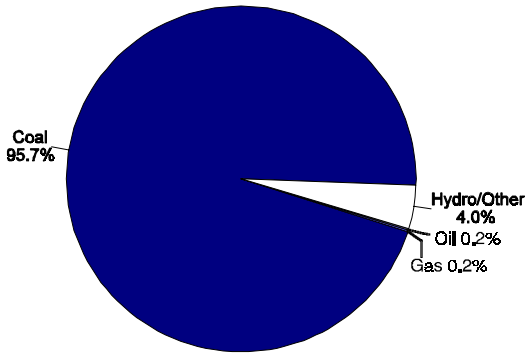


Figure 3. Energy Consumed at Electric Utilities by Primary Energy Source, 1996

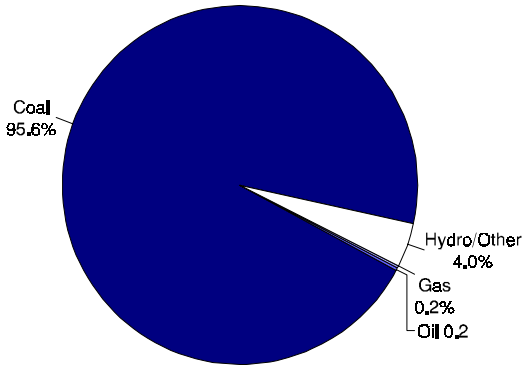


Table 4. Electric Power Industry Generating Capability by Primary Energy Source, 1986, 1991, and 1996
(Megawatts Electric)

Fuel	1986	1991	1996	Percentage Share 1986	Percentage Share 1991	Percentage Share 1996
Coal	13,919	14,129	14,045	*92.1*	*92.1*	*89.5*
Oil	186	184	186	*1.2*	*1.2*	*1.2*
Gas	223	225	663	*1.5*	*1.5*	*4.2*
Nuclear	--	--	--	--	--	--
Hydro/Other	782	795	792	*5.2*	*5.2*	*5.0*
Total Utility	15,110	15,333	15,686	*100.0*	*100.0*	*100.0*
Total Nonutility	--	--	W	--	--	--

-- = Not applicable. W = Withheld.

Table 5. Electric Power Industry Generation of Electricity by Primary Energy Source, 1986, 1991, and 1996
(Thousand Kilowatthours)

Fuel	1986	1991	1996	Percentage Share 1986	Percentage Share 1991	Percentage Share 1996
Coal	64,011,936	71,713,851	84,659,818	*95.7*	*95.0*	*95.7*
Oil	126,855	111,558	135,437	*0.2*	*0.1*	*0.2*
Gas	42,502	21,871	145,980	*0.1*	*(s)*	*0.2*
Nuclear	--	--	--	--	--	--
Hydro/Other	2,733,921	3,657,801	3,496,989	*4.1*	*4.8*	*4.0*
Total Utility	66,915,214	75,505,081	88,438,224	*100.0*	*100.0*	*100.0*
Total Nonutility	--	--	W	--	--	--

-- = Not applicable. W = Withheld. (s) = Nonzero percentage less than 0.05.

Table 6. Electric Power Industry Consumption by Primary Energy Source, 1986, 1991, and 1996
(Quadrillion Btu)

Fuel	1986	1991	1996	Percentage Share 1986	Percentage Share 1991	Percentage Share 1996
Coal	0.656	0.725	0.855	*95.6*	*94.8*	*95.6*
Oil	0.001	0.001	0.002	*0.2*	*0.2*	*0.2*
Gas	(s)	(s)	0.002	*0.1*	--	*0.2*
Nuclear	--	--	--	--	--	--
Hydro/Other	0.029	0.038	0.036	*4.2*	*5.0*	*4.0*
Total Utility	0.686	0.764	0.895	*100.0*	*100.0*	*100.0*
Total Nonutility	--	--	W	--	--	--

-- = Not applicable. W = Withheld. (s) = Nonzero value less than 0.0005.

Figure 4. Utility Generation of Electricity by Primary Energy Source, 1986-1996

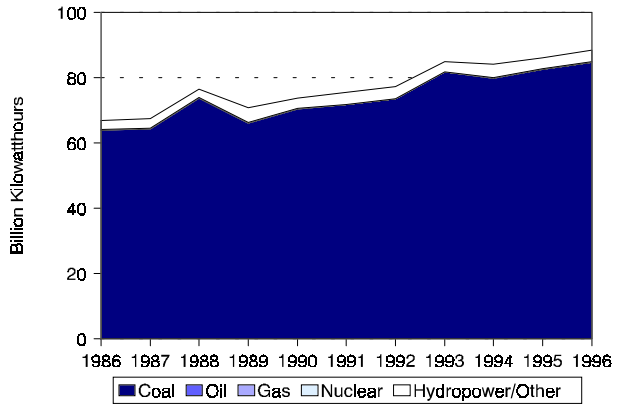


Figure 5. Utility Delivered Fuel Prices for Coal, Oil, and Gas, 1986-1996
(1996 Dollars)

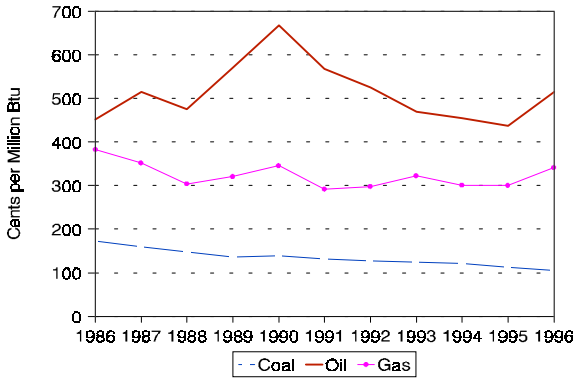


Table 7. Utility Delivered Fuel Prices for Coal, Oil, and Gas, 1986, 1991, and 1996
(Cents per Million Btu, 1996 Dollars)

Fuel	1986	1991	1996	Annual Growth Rate 1986-1996 (Percent)
Coal	172.7	132.3	105.9	-4.8
Oil	452.2	567.7	515.4	1.3
Gas	382.9	291.9	341.3	-1.0

Table 8. Electric Power Industry Emissions Estimates, 1986, 1991, and 1996
(Thousand Short Tons)

Emission Type	1986	1991	1996	Annual Growth Rate 1986-1996 (Percent)
Sulfur Dioxide	748	868	789	0.5
Nitrogen Oxides[d]	303	316	339	1.1
Carbon Dioxide[d]	67,309	74,777	88,309	2.8

Figure 6. Estimated Sulfur Dioxide Emissions, 1986-1996

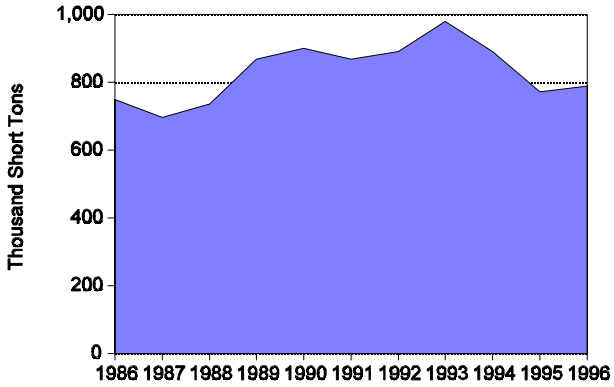


Figure 7. Estimated Nitrogen Oxide Emissions, 1986-1996

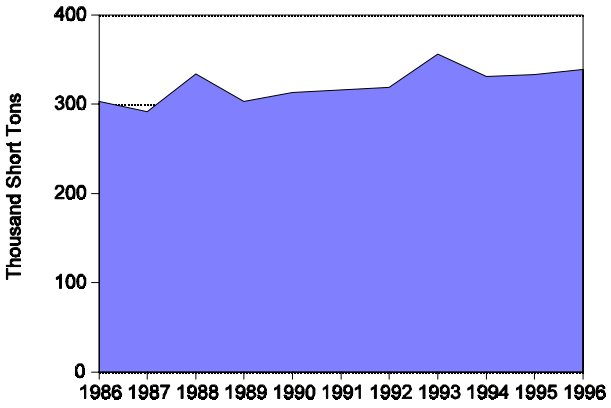


Figure 8. Estimated Carbon Dioxide Emissions, 1986-1996

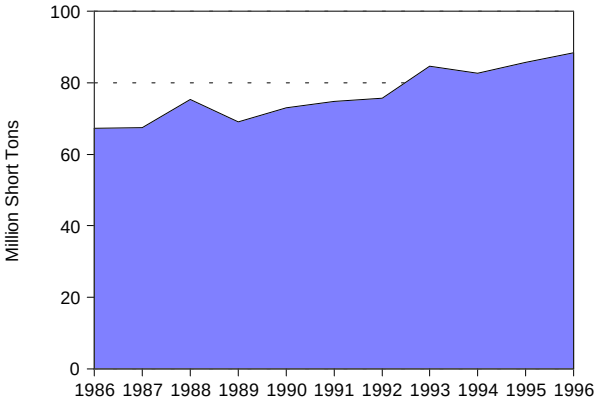


Table 9. Utility Retail Sales by Sector, 1986, 1991, and 1996
(Megawatthours)

Sector	1986	1991	1996	Annual Growth Rate 1986-1996 (Percent)	Percentage Share 1986	Percentage Share 1991	Percentage Share 1996
Residential	15,306,747	18,644,458	21,353,214	3.4	30.8	29.0	27.7
Commercial	7,664,405	9,899,870	10,658,512	3.4	15.4	15.4	13.8
Industrial	24,475,913	32,938,945	41,929,526	5.5	49.3	51.3	54.4
Other	2,248,529	2,710,529	3,077,482	3.2	4.5	4.2	4.0
Total	49,695,596	64,193,802	77,018,734	4.5	100.0	100.0	100.0

Table 10. Utility Retail Sales Statistics, 1986, 1991, and 1996

Item	Investor-Owned Utility	Public	Federal	Cooperative	Total
			1986		
Number of Utilities	5	31	1	28	65
Number of Retail Customers	915,750	181,449	24	493,448	1,590,671
Retail Sales (MWh)	30,699,612	4,486,953	1,967,105	12,541,926	49,695,596
Percentage of Retail Sales	61.8	9.0	4.0	25.2	100.0
Revenue from Retail Sales (thousand 1996 dollars)[e]	1,820,746	281,571	310,844	771,713	3,275,330
Percentage of Revenue	55.6	8.6	12.3	23.6	100.0
			1991		
Number of Utilities	6	30	1	27	64
Number of Retail Customers	1,012,018	183,941	15	548,572	1,744,546
Retail Sales (MWh)	40,620,383	5,105,910	2,103,152	16,364,357	64,193,802
Percentage of Retail Sales	63.3	8.0	3.3	25.5	100.0
Revenue from Retail Sales (thousand 1996 dollars)[e]	1,815,248	283,964	151,594	910,791	3,180,394
Percentage of Revenue	57.1	8.9	5.4	28.6	100.0
			1996		
Number of Utilities	6	30	1	27	64
Number of Retail Customers	1,061,951	193,582	22	624,779	1,880,334
Retail Sales (MWh)	43,264,365	6,000,936	8,487,060	19,266,373	77,018,734
Percentage of Retail Sales	56.2	7.8	11.0	25.0	100.0
Revenue from Retail Sales (thousand 1996 dollars)[e]	1,713,400	294,062	189,636	906,405	3,103,503
Percentage of Revenue	55.2	9.5	6.1	29.2	100.0